Supplementary File: Estimating family planning coverage from contraceptive prevalence using national household surveys

Aluisio J D Barros, Ties Boerma, Ahmad Reza Hosseinpoor, María Clara Restrepo-Méndez, Kerry Wong, Cesar G Victora. Global Health Action 2015; 8:29735.

Data source for the analyses

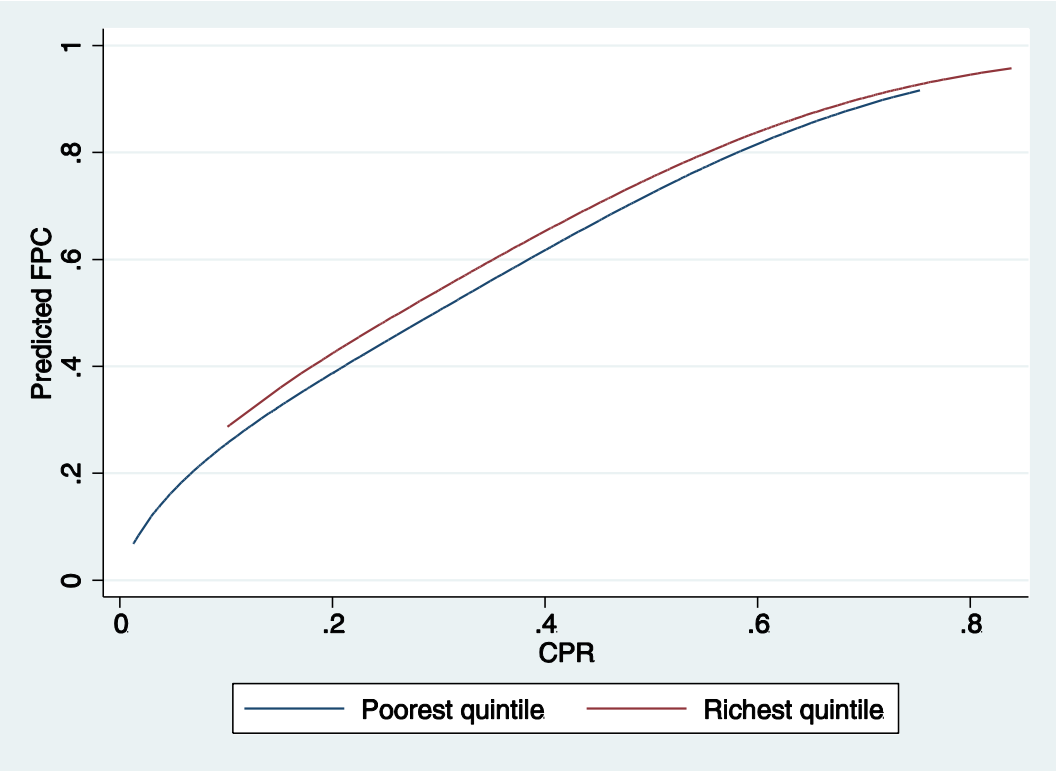
S1 Table – List of surveys used in the present analyses.

Order	Country	Year	Source
1.	Albania	2008	DHS
2.	Armenia	2000	DHS
3.	Armenia	2005	DHS
4.	Armenia	2010	DHS
5.	Azerbaijan	2006	DHS
6.	Bangladesh	1993	DHS
7.	Bangladesh	1996	DHS
8.	Bangladesh	1999	DHS
9.	Bangladesh	2004	DHS
10.	Bangladesh	2007	DHS
11.	Bangladesh	2011	DHS
12.	Benin	1996	DHS
13.	Benin	2001	DHS
14.	Benin	2006	DHS
15.	Bolivia	1994	DHS
16.	Bolivia	1998	DHS
17.	Bolivia	2003	DHS
18.	Bolivia	2008	DHS
19.	Bosnia and Herzegovina	2006	MICS
20.	Brazil	1996	DHS
21.	Burkina Faso	1998	DHS
22.	Burkina Faso	2003	DHS
23.	Burkina Faso	2006	MICS
24.	Burkina Faso	2010	DHS
25.	Burundi	2010	DHS
26.	CAR	1994	DHS
27.	CAR	2006	MICS
28.	Cambodia	2000	DHS
29.	Cambodia	2005	DHS
30.	Cambodia	2010	DHS
31.	Cameroon	1998	DHS
32.	Cameroon	2004	DHS
33.	Cameroon	2011	DHS
34.	Chad	1996	DHS
35.	Chad	2004	DHS
36.	Colombia	1995	DHS
37.	Colombia	2000	DHS
38.	Colombia	2005	DHS
39.	Colombia	2010	DHS
40.	Comoros	1996	DHS
41.	Congo Brazzaville	2005	DHS
42.	Congo Brazzaville	2011	DHS
43.	Congo DR	2007	DHS
44.	Cote d'Ivoire	1994	DHS
45.	Cote d'Ivoire	1998	DHS
46.	Cote d'Ivoire	2006	MICS
47.	Cote d'Ivoire	2011	DHS
48.	Cuba	2006	MICS
49.	Djibouti	2006	MICS
50.	Dominican Republic	1996	DHS
51.	Dominican Republic	1999	DHS
52.	Dominican Republic	2002	DHS
53.	Dominican Republic	2007	DHS
54.	Egypt	1995	DHS
55.	Egypt	2000	DHS
56.	Egypt	2005	DHS
57.	Egypt	2008	DHS
58.	Ethiopia	2000	DHS
59.	Ethiopia	2005	DHS
60.	Ethiopia	2011	DHS
61.	Gabon	2000	DHS
62.	Gabon	2012	DHS
63.	Ghana	1993	DHS
64.	Ghana	1998	DHS
65.	Ghana	2003	DHS
66.	Ghana	2008	DHS
67.	Guatemala	1995	DHS
68.	Guatemala	1998	DHS
69.	Guinea	1999	DHS
70.	Guinea	2005	DHS
71.	Guinea Bissau	2006	MICS
72.	Guyana	2006	MICS
73.	Guyana	2009	DHS
74.	Haiti	1994	DHS
75.	Haiti	2000	DHS
76.	Haiti	2005	DHS
77.	Haiti	2012	DHS
78.	Honduras	2005	DHS
79.	Honduras	2011	DHS
80.	India	1998	DHS
81.	India	2005	DHS
82.	Indonesia	1994	DHS
83.	Indonesia	1997	DHS
84.	Indonesia	2002	DHS
85.	Indonesia	2007	DHS
86.	Indonesia	2012	DHS
87.	Iraq	2006	MICS
88.	Jordan	1997	DHS
89.	Jordan	2002	DHS
90.	Jordan	2007	DHS

Order	Country	Year	Source
91.	Jordan	2012	DHS
92.	Kazakhstan	1995	DHS
93.	Kazakhstan	1999	DHS
94.	Kenya	1993	DHS
95.	Kenya	1998	DHS
96.	Kenya	2003	DHS
97.	Kenya	2008	DHS
98.	Kyrgyzstan	1997	DHS
99.	Kyrgyzstan	2005	MICS
100.	Lesotho	2004	DHS
101.	Lesotho	2009	DHS
102.	Liberia	2007	DHS
103.	Macedonia	2005	MICS
104.	Madagascar	1997	DHS
105.	Madagascar	2003	DHS
106.	Madagascar	2008	DHS
107.	Malawi	2000	DHS
108.	Malawi	2004	DHS
109.	Malawi	2010	DHS
110.	Maldives	2009	DHS
111.	Mali	1995	DHS
112.	Mali	2001	DHS
113.	Mali	2006	DHS
114.	Mauritania	2007	MICS
115.	Moldova	2005	DHS
116.	Mongolia	2005	MICS
117.	Montenegro	2005	MICS
118.	Morocco	2003	DHS
119.	Mozambique	1997	DHS
120.	Mozambique	2003	DHS
121.	Mozambique	2011	DHS
122.	Namibia	2000	DHS
123.	Namibia	2006	DHS
124.	Nepal	1996	DHS
125.	Nepal	2001	DHS
126.	Nepal	2006	DHS
127.	Nepal	2011	DHS
128.	Nicaragua	1997	DHS
129.	Nicaragua	2001	DHS
130.	Niger	1998	DHS
131.	Niger	2006	DHS
132.	Niger	2012	DHS
133.	Nigeria	1999	DHS
134.	Nigeria	2003	DHS
135.	Nigeria	2007	MICS
136.	Nigeria	2008	DHS
137.	Pakistan	2006	DHS
138.	Pakistan	2012	DHS
139.	Peru	1996	DHS
140.	Peru	2000	DHS
141.	Peru	2004	DHS
142.	Peru	2005	DHS
143.	Peru	2006	DHS
144.	Peru	2007	DHS
145.	Peru	2008	DHS
146.	Peru	2009	DHS
147.	Peru	2010	DHS
148.	Peru	2011	DHS
149.	Peru	2012	DHS
150.	Philippines	1993	DHS
151.	Philippines	1998	DHS
152.	Philippines	2003	DHS
153.	Philippines	2008	DHS
154.	Rwanda	2000	DHS
155.	Rwanda	2005	DHS
156.	Rwanda	2010	DHS
157.	Sao Tome and Principe	2008	DHS
158.	Senegal	1997	DHS
159.	Senegal	2005	DHS
160.	Senegal	2010	DHS
161.	Serbia	2005	MICS
162.	Sierra Leone	2008	DHS
163.	South Africa	1998	DHS
164.	Suriname	2006	MICS
165.	Swaziland	2006	DHS
166.	Syria	2006	MICS
167.	Tajikistan	2005	MICS
168.	Tajikistan	2012	DHS
169.	Tanzania	1996	DHS
170.	Tanzania	1999	DHS
171.	Tanzania	2004	DHS
172.	Tanzania	2010	DHS
173.	Timor Leste	2009	DHS
174.	Togo	1998	DHS
175.	Togo	2006	MICS
176.	Trinidad and Tobago	2006	MICS
177.	Turkey	1993	DHS
178.	Turkey	1998	DHS
179.	Turkey	2003	DHS
180.	Uganda	1995	DHS
181.	Uganda	2000	DHS
182.	Uganda	2006	DHS
183.	Uganda	2011	DHS
184.	Ukraine	2005	MICS
185.	Ukraine	2007	DHS
186.	Uzbekistan	1996	DHS
187.	Uzbekistan	2006	MICS
188.	Vietnam	1997	DHS
189.	Vietnam	2002	DHS
190.	Yemen	2006	MICS
191.	Zambia	1996	DHS
192.	Zambia	2001	DHS
193.	Zambia	2007	DHS
194.	Zimbabwe	1994	DHS
195.	Zimbabwe	1999	DHS
196.	Zimbabwe	2005	DHS
197.	Zimbabwe	2010	DHS

Comparison of models for the extreme wealth quintiles

We found that wealth quintiles are associated with FPC, and for any given level of CPR, wealthier women have a higher FPC (Figure S1). We considered, though, that the differences are small enough not to be taken into account in our predictive model.

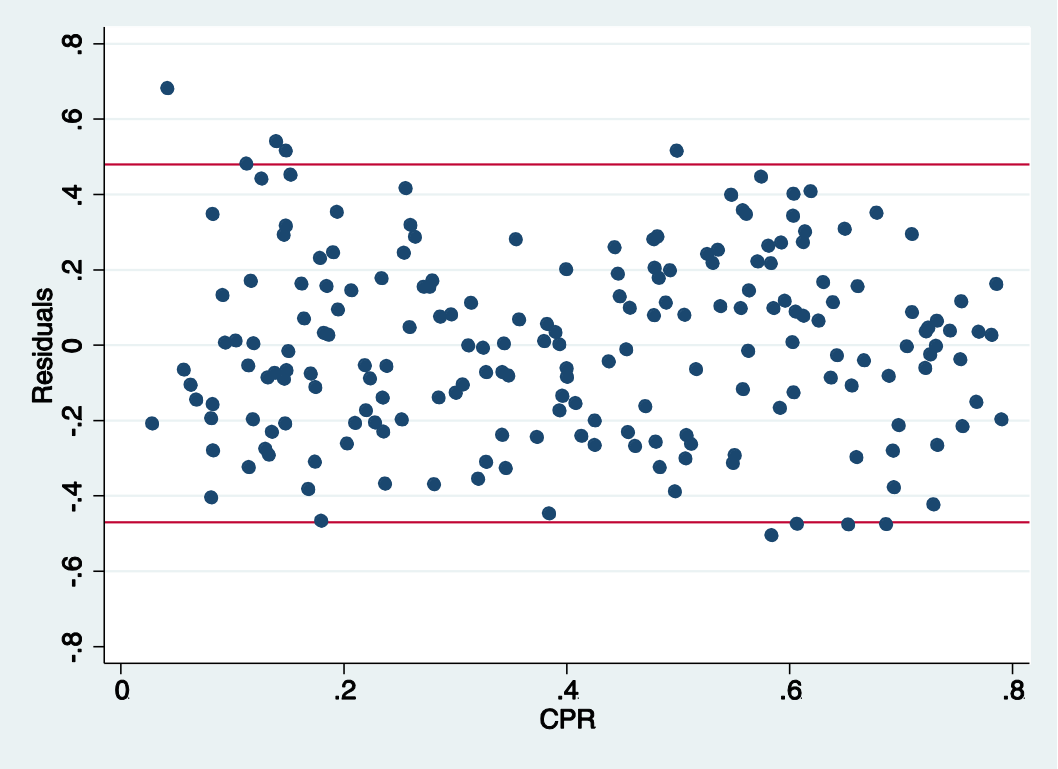


S1 Figure – Predicted values of Family Planning Coverage (FPC) for the richest (Q5) and poorest (Q1) wealth quintiles

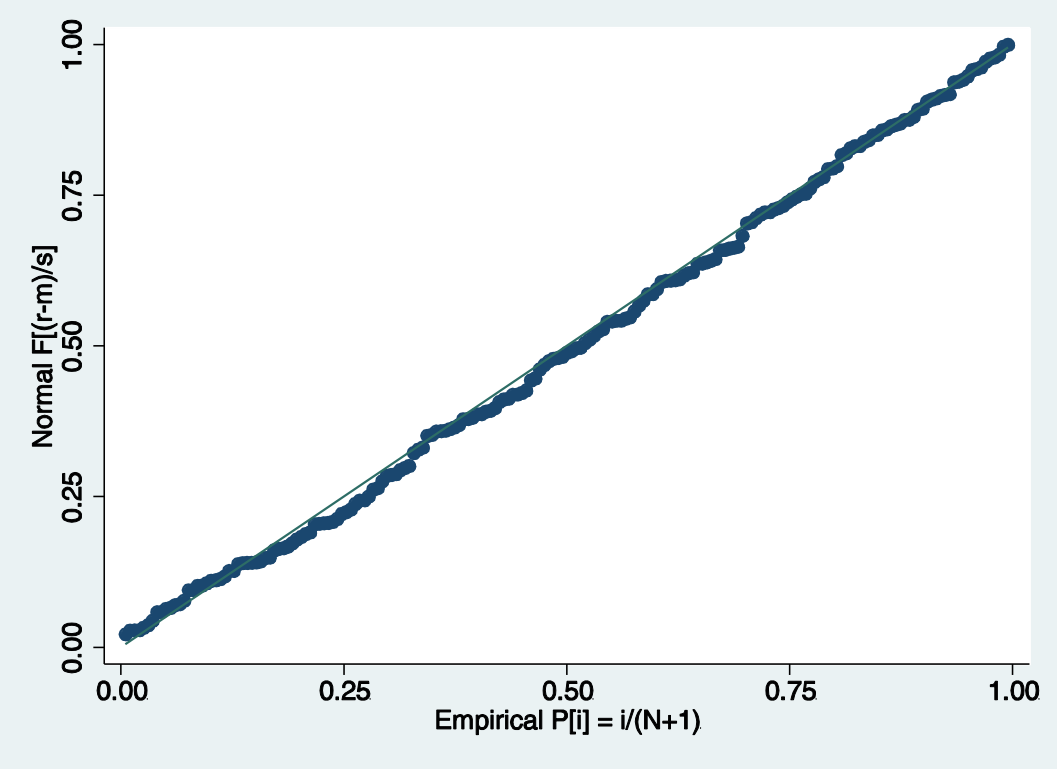
Residual diagnostics of the predictive model

In order to check the quality of the fit obtained with our country level predictive model, we assessed the behaviour of the residuals. In Figure S2 we can see no evidence of unexplained trend, and no suggestion of increasing or decreasing variability along the predictor range of variation. In Figure S3, the normal plot suggests the residuals are very close to a normal distribution.

```
. fp <cpmt_r> : reg fpslogit <cpmt_r>, cluster(country)
(fitting 44 models)
(....10%....20%....30%....40%....50%....60%....70%....80%....90%....100%)

Linear regression                                       Number of obs =     197
                                                        F(  2,    81) =  906.31
                                                        Prob > F      =  0.0000
                                                        R-squared     =  0.9469
                                                        Root MSE      =  .25535

                                    (Std. Err. adjusted for 82 clusters in country)
------------------------------------------------------------------------------
             |               Robust
    fpslogit |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    cpmt_r_1 |   .6779366   .0626886    10.81   0.000      .553206    .8026672
    cpmt_r_2 |   3.567283   .2119167    16.83   0.000     3.145635    3.988931
       _cons |   .6100581   .1141839     5.34   0.000     .3828678    .8372483
------------------------------------------------------------------------------
```



S2 Figure – Residuals vs predictor plot with lines enclosing 95% of residuals.

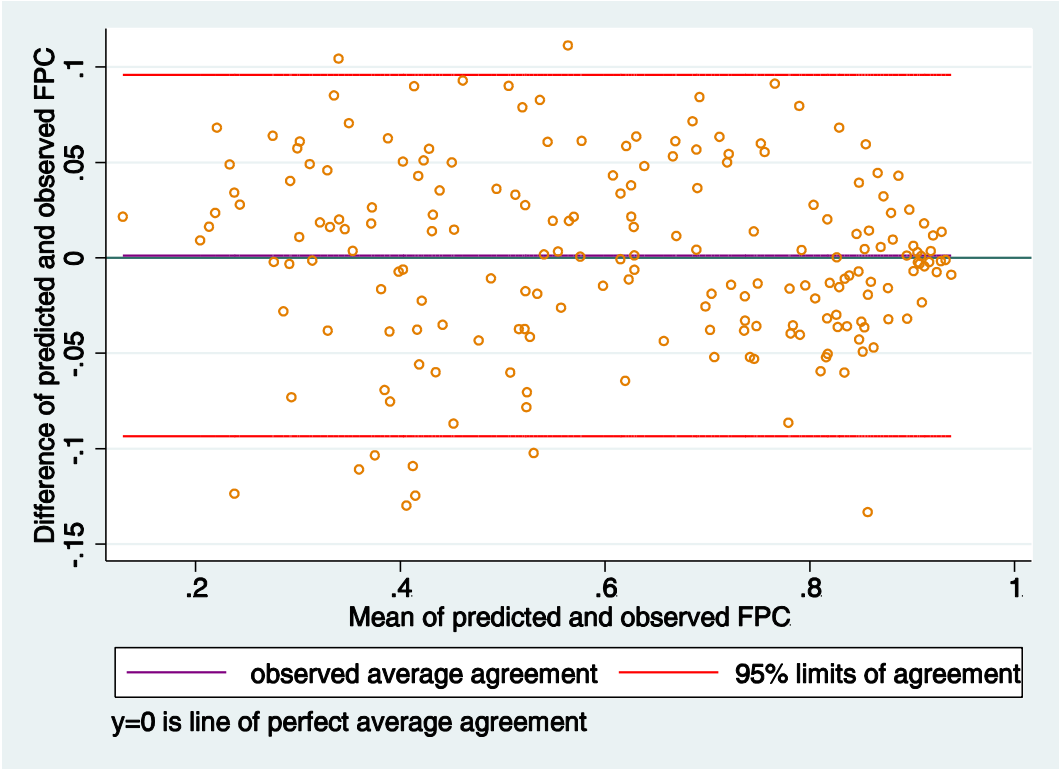


S3 Figure – Residuals normal probability plot.

Concordance between predicted and observed values of FPC

We assessed the concordance in order to have an idea of the precision for the individual prediction that is determined by the precision of the regression line plus the root of the mean squared error of the residual. In our case, the individual predictions vary approximately ±9 percent points around the true value.

```
Concordance correlation coefficient (Lin, 1989, 2000):

 rho_c   SE(rho_c)   Obs     [   95% CI   ]      P        CI type
-------------------------------------------------------------------
 0.976     0.003     197      0.969  0.982    0.000   asymptotic
                              0.968  0.981    0.000   z-transform

Pearson's r =   0.976  Pr(r = 0) = 0.000  C_b = rho_c/r =  1.000
Reduced major axis:   Slope =     0.980   Intercept =     0.013

Difference = pfp1inv - fps_r

        Difference                  95% Limits Of Agreement
   Average     Std Dev.              (Bland & Altman, 1986)
-------------------------------------------------------------------
     0.001       0.048                  -0.093      0.096

Correlation between difference and mean = -0.090

Bradley-Blackwood F = 0.857 (P = 0.42613)
```



S4 Figure – Limits of agreement between predicted and observed values of family planning coverage.